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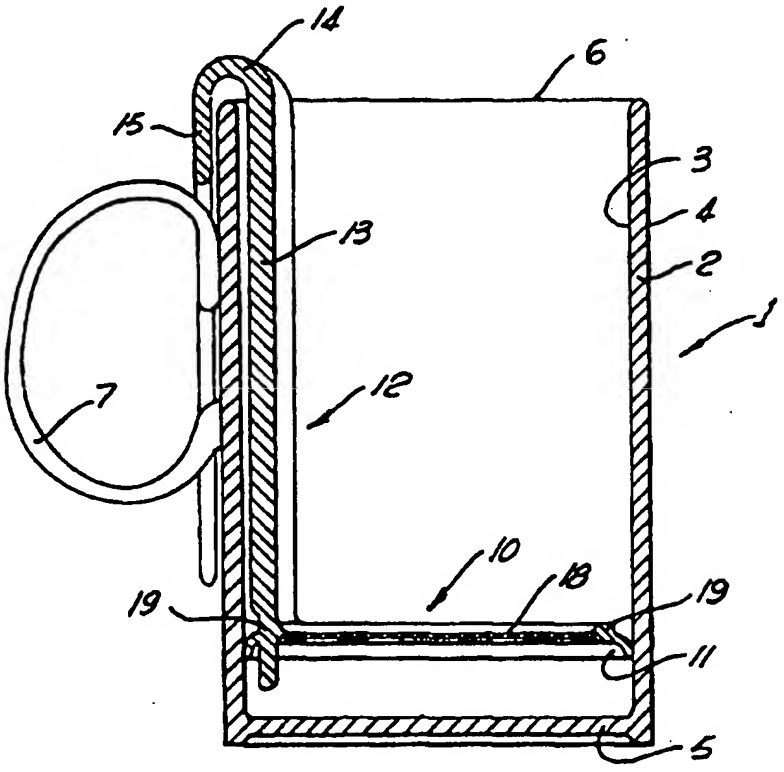
*With international search report.*

(54) Title: PLUNGER DEVICE

(57) Abstract

A plunger filter apparatus comprising: (a) a drinking vessel (1) having a side wall (2) and a bottom wall (5); and (b) a plunger having a filter element (10) adapted to slidably and sealingly engage the side wall (2) of the vessel and having a driving member (12), at least a portion (13) of the driving member extending parallel to and adjacent the interior side wall surface (3) of the vessel and cooperating with vessel (1) to guide the filter element (10) so that the filter element remains horizontal during plunging.



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TITLE: **PLUNGER DEVICE**

TECHNICAL FIELD:

This invention relates to a plunger filter apparatus and more particularly a single cup plunger filter apparatus.

BACKGROUND:

It is well known to prepare a quantity of coffee sufficient to fill several cups by means of a plunger filter apparatus and then to dispense the coffee into cups. A "single-cup" plunger apparatus is also known which comprises a drinking vessel and a plunger assembly including a filter element. The drinking vessel is usually made of plastic or glass having a cylindrical side wall, a bottom wall, a handle and a lid. The plunger assembly comprises a filter element and a plunger shaft. The plunger shaft is adapted to pass axially through the lid via a suitably shaped central aperture and is connected to the centre of the filter element via a bayonet fitting. The filter element is adapted at its periphery to slidably and sealingly engage the cylindrical side walls of the vessel.

In normal use, with the lid and plunger assembly removed, ground coffee or tea leaves are first spooned into the drinking vessel. Boiling water is then added to the

vessel and stirred. The plunger assembly is next inserted into the vessel with the filter element above the contents and with the lid closing the vessel. As an alternative, the water is boiled in the drinking vessel and then the coffee or tea is added. In either case the apparatus is allowed to stand while the coffee or tea brews. When the coffee or tea has sufficiently brewed the filtration step commences whereby the plunger shaft is depressed pushing the filter element through the liquid. The coffee grounds or tea leaves are pushed towards the bottom wall of the vessel. When the filter element has been pushed far enough, the bayonet fitting shaft is disconnected from the filter. The shaft and lid are removed from the vessel leaving the filter element at the bottom of the vessel so as to keep the coffee grounds or tea leaves trapped between the filter element and the bottom wall of the drinking vessel. The user can then drink directly from the vessel.

It has been found that such apparatus suffers from a number of disadvantages.

Firstly it is a nuisance to have to remove the lid, often with moisture condensed on it, and a dripping plunger shaft before drinking from the vessel. However without the lid to guide the plunger shaft the filter element cannot be kept horizontal and allows solids to escape the filtration process. Secondly, in use, the shaft either becomes easily inadvertently detached from the bayonet connected filter, or is difficult to detach because the filter element rotates with the shaft.

It is an object of the present invention to provide an improved apparatus for preparing coffee, tea or the like which avoids or at least ameliorates some of the disadvantages of the prior art apparatus.

According to one aspect the present invention consists in a plunger filter apparatus comprising

(a) a drinking vessel having a side wall and a bottom wall; and

(b) a plunger having a filter element adapted to slidably and sealingly engage the side wall of the vessel and a driving member, at least a portion of the driving member extending parallel to and adjacent the interior side wall

surface of the vessel and cooperating with the vessel to guide the filter element so that the filter element remains horizontal during plunging.

Preferably, the filter element is integral with or securely attached to the driving member.

The driving member may, for example, cooperate with, and be constrained by, the inner or the outer surface (or both) of the vessel wall so as to maintain the filter element in a substantially horizontal configuration. Alternatively, the driving member may cooperate with the handle of the vessel to maintain the filter element in a horizontal configuration or the drinking vessel wall may be provided with formations such as grooves or ridges which inter-engage with the filter driving member to provide guidance of the filter element during plunging.

According to a second aspect the invention consists in a plunger suitable for use in a drinking vessel of the kind having a side wall, a bottom, a rim, and a substantially constant cross section between the bottom and the rim, said plunger comprising a filter element adapted to slideably and sealingly engage the side wall of the vessel, and a drive member extending in a direction generally perpendicular to the plane of the filter; the drive member in use extending adjacent to the wall of the vessel between the filter and the rim, and cooperating with the vessel to guide the filter element so that it remains horizontal during plunging.

According to a third aspect the invention consists in a method of preparing coffee or tea comprising the steps of:

(a) placing a drinking vessel containing a liquid in a microwave oven;

(b) heating the liquid to a required temperature;

(c) adding the coffee or tea to the heated liquid;

(d) inserting into the vessel a plunger assembly having a filter element adapted to slidably and sealingly engage a side wall of the vessel and having a driving member securely attached to the filter element, the drive member

extending parallel to and adjacent the inner surface of the side wall of the vessel; and

(e) plunging the filter element so as to trap the coffee or tea at the bottom of said vessel.

If desired the coffee or tea can then be drunk directly from the vessel without removing the plunger.

In preferred embodiments of the invention the plunger assembly is disposable and incorporates a tea bag or coffee container.

BRIEF DESCRIPTION OF THE DRAWINGS:

Various embodiments of the invention will now be more particularly described by way of example only with reference to the accompanying drawings wherein:

Figure 1 shows a diametric cross section of a first embodiment according to the invention in elevation,

Figure 2 shows the embodiment of Fig. 1 in plan view;

Figure 3 shows the embodiment of Fig. 1 in elevation viewed in a direction rotated at 90° from that of Fig. 1;

Figure 4 shows a second embodiment of the invention in cross sectional elevation;

Figure 5 shows a cross section of the embodiment shown in Fig. 4 on line A-A;

Figure 6 shows a cross section of the embodiment shown in Fig. 4 on line B-B;

Figure 7 shows (schematically) a third embodiment of a plunger assembly of the present invention in cross sectional elevation;

Figure 8 shows (schematically) a fourth embodiment of a plunger assembly of the present invention in cross sectional elevation;

A first embodiment of the embodiment of the invention will now be described by way of example only with reference to Figures 1 to 3 in which there is shown a

drinking vessel 1 having a cylindrical side wall 2 with an interior side 3 and an exterior side 4, a circular bottom 5, a circular rim 6, and a handle 7.

A first embodiment of a plunger according to the invention comprises a circular filter element 10 having a seal 11 at its periphery which form a sliding seal with inner wall 3 of the vessel.

A filter driving member indicated generally at 12 extends from the peripheral edge of filter element 10 in an upward direction adjacent to inner surface 3 of wall 2 for a length preferably greater than the depth from rim 6 to bottom 5 of the vessel.

In the embodiments of Figures 1 to 3 driving member 12 has an upwardly extending leg 13 smoothly connected via an arch 14 with a downwardly extending leg 15. As shown in Figure 3, the downwardly extending leg 15 is bifurcated with branches 16, 17 adapted to straddle handle 7. Although in the embodiment illustrated in Figure 1 the downwardly extending exterior leg 15 is shown as shorter than interior leg 13, branches 16, 17 of leg 15 may extend downwardly to the level of filter element 10 or lower; provided that the filter element is not thereby prevented from approaching to within a practical distance from the base. Filter element 10 comprises a gauze 18 of a fineness which allows passage of liquid but not of coffee grounds or tea leaves, the gauze being supported by a more or less rigid ring 19 at its periphery. The plunger is desirably formed as a unitary plastic moulding.

In use, with the plunger assembly removed from vessel 1, coffee is placed in the vessel and boiling water is added and stirred. Filter element 10 is then inserted in sealing engagement with vessel interior wall 3 just below lip 6 until the coffee has brewed. Filter element 10 is then driven downwardly through the liquid by means of driving element 12. Filter element is guided to remain horizontal (that is to say in a plane substantially perpendicular to the cylindrical axis of the vessel) by virtue that the driving element 12 is guided by interior wall 3 and/or exterior wall 4 of vessel 1 and by virtue that branches 16 and 17 of external leg 15 of drive member 12 are guided by vessel handle 7.

Filter element 10 is driven downwardly until the grounds are trapped between filter gauze 18 and vessel floor 5. The beverage above the filter element may then be consumed free of coffee grounds, while leaving the filter element in the fully plunged position.

In the embodiment of figures 4-8, parts which correspond in function with parts of the embodiment of figures 1 to 3 are identified with corresponding numerals.

A second embodiment of the plunger is shown in figures 4-6. The embodiment differs from that of figures 1 to 3 in that a portion of the driving member 12 extends in the circumferential direction of vessel interior wall 3 and closely adjacent thereto and this functions to guide the driving member so as to maintain the filter element in a horizontal configuration during plunging. In another embodiment (not illustrated) driving member 12 may be of cylindrical form over at least a portion of its length in the axial direction. For example the filter element may have a peripheral upwardly or downwardly extending cylindrical wall which cooperates with a vessels interior wall to guide the plunger. In another embodiment (not illustrated) the vessel is provided with formations such as grooves or ribs extending vertically on the interior or exterior of side wall 2 and which are adapted to cooperate with interengaging formations associated with driving member 12 to guide the filter element so that it remains horizontal during plunging.

The filter element need not be of unitary construction but may for example, be an assembly of the kind used in conventional coffee plungers, that is to say, may comprise a gauze sandwiched between an upper apertured disk and a lower apertured disk, the sandwich being held together by means of a threaded fastener or the like at the centre. In that construction the upper plate is provided with a coil like spring mounted at the periphery which urges the gauze outwardly at its edges to engage the vessel wall. However, in contrast to the conventional assembly, in apparatus according to the invention the driving member is located adjacent the wall rather than in an axial location.

In use of the apparatus water is boiled in the drinking vessel by conventional means, for example, by microwave energy, and coffee grounds or tea leaves are then added. The coffee grounds float to the top of the liquid forming a layer or plug of coffee grounds at the upper liquid level. Tea leaves usually sink to the bottom of the drinking vessel when boiling water is added, however, surprisingly it has been found that tea leaves float on microwaved water. The plunger assembly is then used to drive the coffee or tea towards the bottom of the vessel. The user can drink directly from the vessel without having to remove the plunger assembly. The liquid can be stirred with a spoon because the driving member is not centrally located but rather is adjacent the side wall of the drinking vessel. In addition, it has been found that because the filter element is adapted to fit snugly with the drinking vessel and is kept horizontal, there is no interchange between the bitter coffee beneath the filter element and the brewed coffee above.

A further embodiment will now be described with reference to figure 7. The plunger of figure 7 is similar to that described with reference to the first and second embodiment but differs in that there is provided a downwardly extending cylindrical skirt 20 which is provided with a snugly fitting removable closure 21 to form a compartment 22 which may be used to contain coffee grounds, tea leaves or a tea bag.

With reference to figure 8 there is shown a plunger similar to that of figure 7 in which the closure is a hinged lid 23 provided with a latch 24 in place of removable closure 21. Desirably, skirt 20 and hinged lid 23 are made of plastics and hinge 25 is a flexible joint. The embodiments of figures 7 and 8 are intended to be marketed as disposable elements provided with tea or coffee contained within compartment 22.

The plunger assembly may be supplied with a cooperating drinking vessel or may be supplied in a range of sizes adapted to retrofit into one or another drinking mug. The filter element may be provided with one or more reinforcing braces extending diametrically and to which a plastic mesh may be welded. However, other forms of filter for example, paper filters, wire mesh filters, perforated plates or the

like may be employed. It is desirable to provide a resilient peripheral seal between the filter element and drinking vessel wall. The seal may be a resilient flap or skirt of flexible plastic or may be in the nature of a rubber O-ring retained in a circumferential groove, or the like or may merely depend on a slideable tight fit between the filter element and the wall.

Desirably, the filter element is provided with a one-way valve to assist in removal of the filter element from the drinking vessel by breaking the vacuum seal. More preferably the one-way valve is a flap valve.

If desired the drive member may be releasably attached to the filter element.

As will be apparent to those skilled in the art from the teaching hereof the invention maybe embodied in other forms without departing from the inventive concept herein disclosed.

CLAIMS:-

1. A plunger filter apparatus comprising:

(a) a drinking vessel having a side wall and a bottom wall; and

(b) a plunger having a filter element adapted to slidably and sealingly engage the side wall of the vessel and having a driving member, at least a portion of the driving member extending parallel to and adjacent the interior side wall surface of the vessel and cooperating with the vessel to guide the filter element so that the filter element remains horizontal during plunging.

2. A plunger filter apparatus according to claim 1 wherein the driving member is guided by the wall of the vessel to enable the plunger assembly to remain horizontal during plunging.

3. A plunger filter apparatus according to Claim 1 wherein the driving member extends upwardly over the lip of the vessel, and then downwardly to follow the exterior side of the vessel.

4. A plunger filter apparatus according to claim 3, wherein the downwardly extending portion comprising a portion adapted to be guided by a formation on the outside of the vessel.

5. A plunger filter apparatus according to claim 4, wherein the formation is a handle of the drinking vessel.

6. A plunger filter apparatus according to any one of Claims 1 to 3 wherein, a portion of the driving member extends in the circumferential direction of the vessel wall and cooperates with the wall of the vessel to guide the filter element.

7. A plunger filter apparatus according to any one of claims 1 to 6, wherein the driving member is integral with the filter element.

8. A plunger filter apparatus according to any one of claims 1 to 6, wherein the driving member is releasably attached to the filter element.

9. A plunger filter apparatus according to any one of claims 1 to 8, wherein the filter element further includes a one-way valve to assist in removal of the filter element from the drinking vessel by breaking a vacuum seal.

10. A plunger filter apparatus according to claim 9, wherein the one-way valve is a flap valve.

11. A plunger filter apparatus according to any one of claims 1 to 10, wherein said filter element comprises a frame to which a plastic mesh is welded.

12. A filter plunger comprising a compartment defined between the filter element, a compartment side wall, and a removable closure, the compartment being suitable for storage of tea, coffee or the like.

13. A filter plunger substantially as herein described with reference to any one of the accompanying drawings.

14. A plunger suitable for use in a drinking vessel of the kind having a side wall, a bottom, a rim, and a substantially constant cross section between the bottom and the rim, said plunger comprising:

a filter element adapted to slideably and sealingly engage the side wall of the vessel, and a drive member extending in a direction generally perpendicular to the plane of the filter; the drive member in use extending adjacent to the wall of the vessel between the filter and the rim, and cooperating with the vessel to guide the filter element so that it remains horizontal during plunging.

15. A method of preparing coffee or tea comprising the steps of:

(a) placing a drinking vessel containing a liquid in a microwave oven;

(b) heating the liquid to the required temperature;

(c) adding the coffee or tea to the heated liquid;

(d) inserting a plunger assembly having (i) a filter element adapted to slidably and sealingly engage a side wall of the vessel; and (ii) a drinking member being securely attached to the filter element and

which extends parallel to and adjacent the inner surface of the side wall of the vessel, into the vessel;

(e) plunging the filter element so as to trap the coffee or tea at the bottom of said vessel; and

(f) drinking the prepared coffee or tea from the vessel.

16. A method of preparing coffee or tea according to claim 15, which method is substantially as herein described.

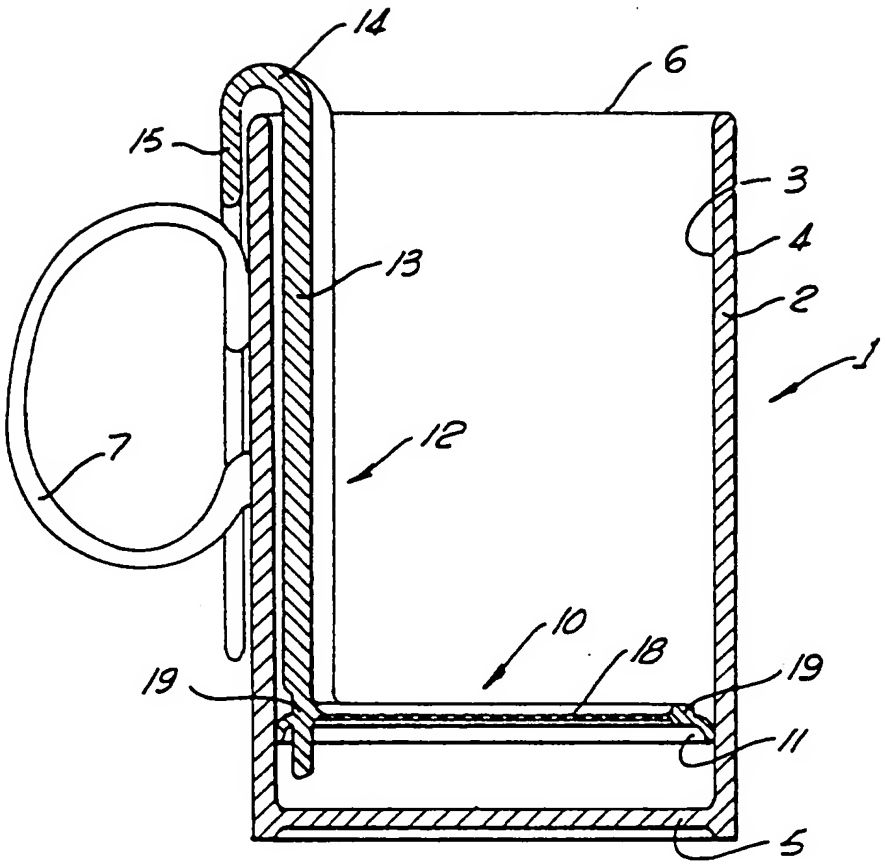


FIG. 1

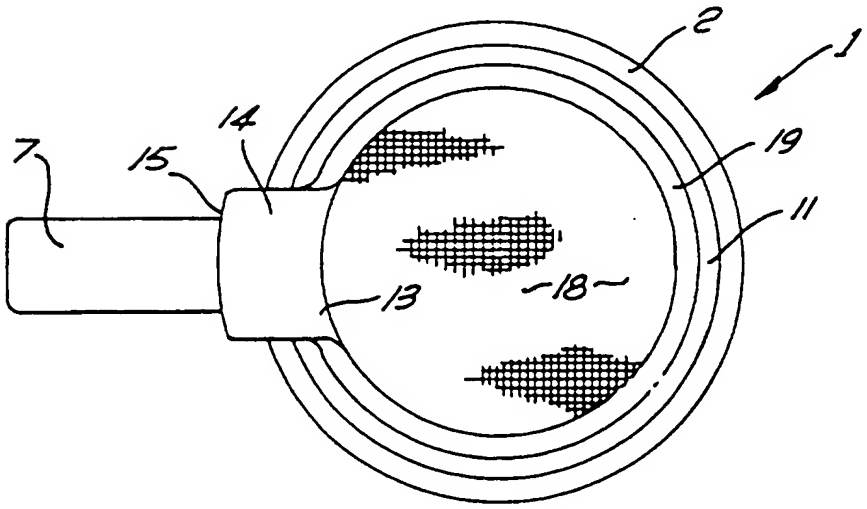


FIG. 2

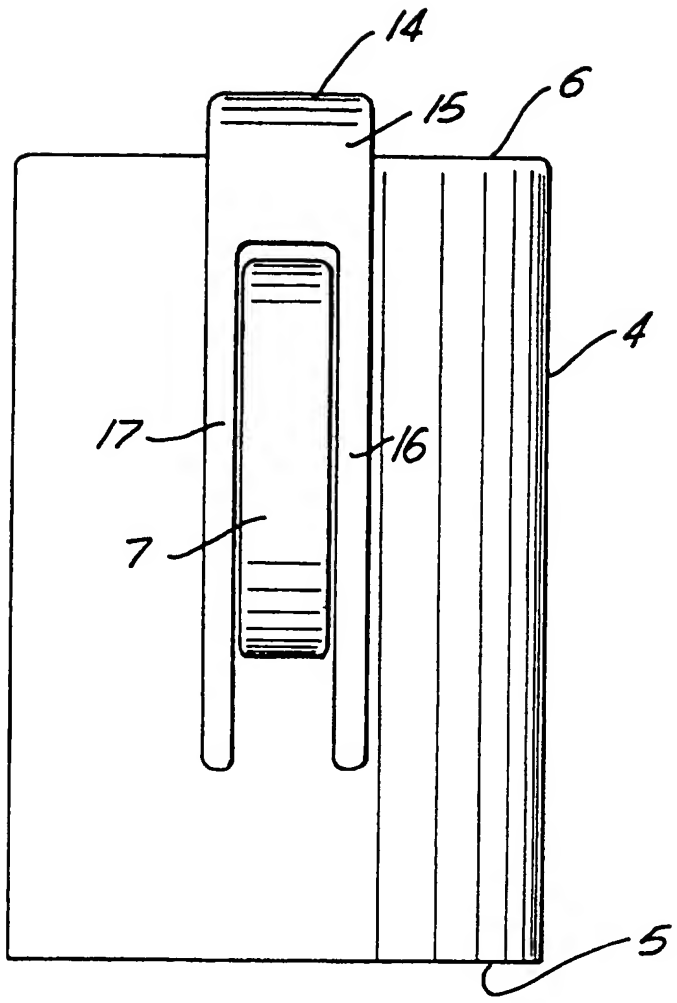


FIG. 3

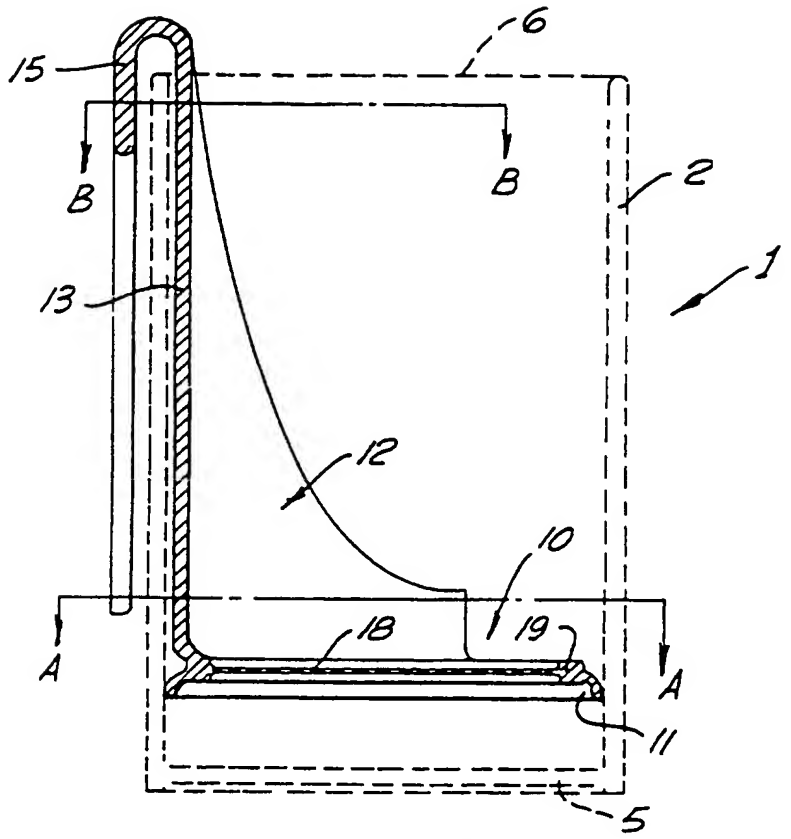


FIG. 4

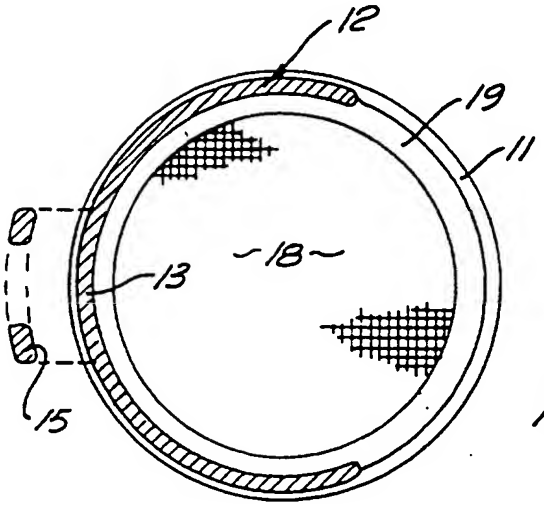


FIG. 5

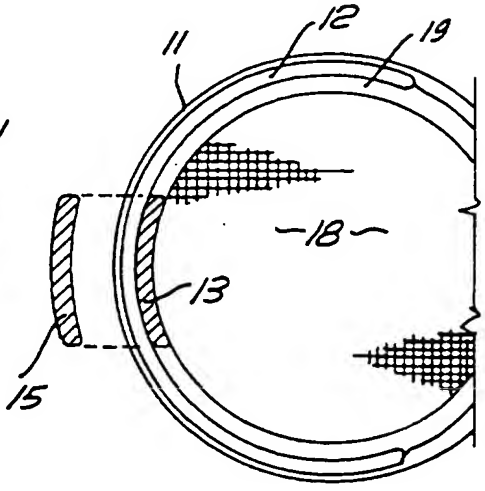


FIG. 6

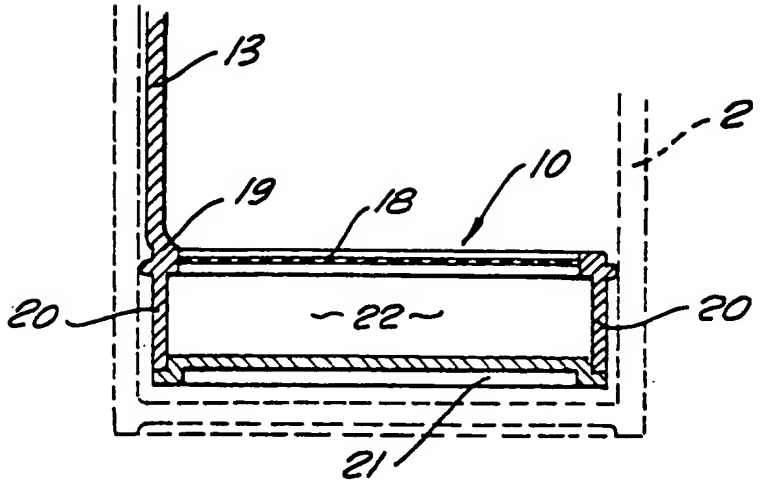


FIG. 7

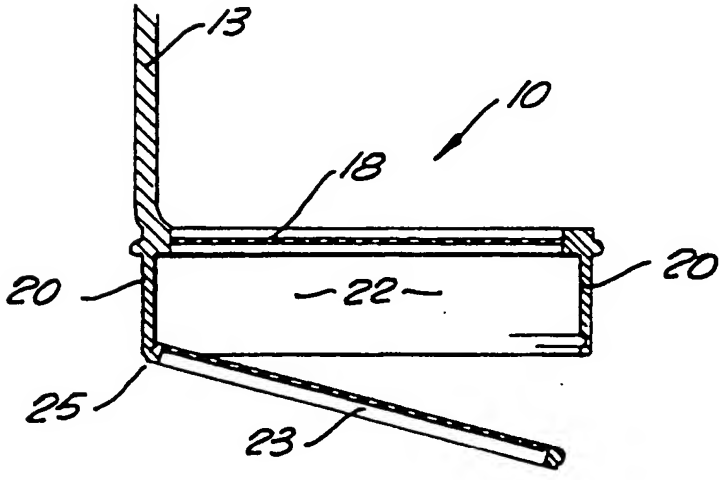


FIG. 8

# INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 95/00519

**A. CLASSIFICATION OF SUBJECT MATTER**

Int Cl[6]: A47J 31/06, 31/18, 31/20; A47G 19/14

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)
IPC: A47J 31/06, 31/18, 31/20; A47G 19/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | AU, 55169/90,A, (MELITTA-WERKE BENTZ & SOHN) 22 November 1990. See entire document | (1-16) |
| P,X | AU, 57660/94,A, (GENERAL FOODS LIMITED) 22 September 1994. (& EP 615714, A) See entire document | 12 |
| A | GB, 2250425, A, (WINNINGTON-INGRAM) 10 June 1992 See entire document | (1-16) |

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
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C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| | WO, 93/08722, A, (ENGLISH)<br>13 May 1993 | |
| A | See entire document | (1-16) |
| | US, 2311759,A, (JOHNSON)<br>23 February 1943 | |
| X | See entire document | 12 |
| A | See entire document | (1-16) |
| | DE, 441724, A, (MENNICKE)<br>10 March 1927 | |
| A | See entire document | (1-16) |

# INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 95/00519

**Box 1 Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

**Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

Claims 1.14 and 15 are directed to a plunger filter apparatus whereby the plunger is used with a drinking vessel and has a driving member which cooperates with the vessel to guide the filter element. Claim 12 however is only directed to a plunger filter which has a compartment with a removable closure and has no mention of either a drinking vessel or a plunger which cooperates with the vessel.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.
PCT/AU 95/00519

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document Cited in Search Report | | Patent Family Member | | | | | |
|---|---|---|---|---|---|---|---|
| AU | 57660/94 | CA | 2119179 | EP | 615714 | JP | 6319645 |
| WO | 9308722 | AU | 30731/92 | EP | 567625 | US | 5249509 |

END OF ANNEX